



Attempt questions first; check the separate key afterward. Show all working. Draw accurate figures where required.

A. Very short answers - 1 mark each

1. Can sound travel through vacuum?
2. Explain why sound needs a medium.
3. What kind of wave is ordinary sound in air?
4. Draw compressions and rarefactions and mark one wavelength.
5. State the SI unit of frequency.
6. A source makes 600 vibrations in 3 s. Find frequency.
7. A wave has frequency 250 Hz and wavelength 1.36 m. Find speed.
8. Find wavelength for 680 Hz at the same speed.

B. Short answers / practice - 2 marks each

9. Find time period of a 50 Hz vibration.
10. Find frequency for time period 0.004 s.
11. Which property chiefly determines pitch?
12. Which vibration property chiefly affects loudness at a given location?
13. State the approximate audible range for young humans.
14. Classify 10 Hz and 40000 Hz sounds.
15. An echo returns after 0.6 s; speed 340 m/s. Find reflector distance.
16. Why is the travelled distance divided by 2?
17. Find minimum reflector distance for a distinct echo assuming 0.1 s separation and 340 m/s speed.
18. Explain the difference between echo and reverberation.
19. Does increasing frequency at fixed wave speed increase wavelength?
20. Compare two waves of frequencies 200 and 400 Hz at equal speed.

C. Application / reasoning - 3 marks each

21. A sonar pulse returns in 2 s; water sound speed 1500 m/s. Find depth.
22. Name two uses of ultrasound apart from sonar.
23. Which ear part vibrates first in response to incoming sound?
24. Trace transmission from ear canal to auditory nerve.
25. Is loudness identical to frequency?
26. Distinguish loudness, pitch and quality/timbre.
27. A sound wave has speed 330 m/s and frequency 165 Hz. Find wavelength.
28. An echo returns after 0.4 s at sound speed 340 m/s. Find reflector distance.
29. Find the period of a 500 Hz vibration.
30. Explain why two instruments can sound different while playing the same note.
31. A sonar pulse returns in 0.8 s through water at 1500 m/s. Find reflector distance.

D. Extended practice - 5 marks per pair

32. A wave travels 990 m in 3 s. Find speed.
33. At frequency 110 Hz, find wavelength.
34. Do curtains and acoustic panels generally reduce reverberation?
35. Design a classroom demonstration that sound is produced by vibration and explain how to reduce unwanted reflected sound.

ANSWER KEY - Numerical / closed questions

- 1) No. 3) Longitudinal. 5) Hertz. 6) 200 Hz. 7) 340 m/s. 8) 0.5 m. 9) 0.02 s. 10) 250 Hz. 11) Frequency. 12) Amplitude. 13) 20 Hz-20000 Hz. 14) Infrasonic; ultrasonic. 15) 102 m. 17) 17 m. 19) No; it decreases. 20) Wavelength ratio 2:1. 21) 1500 m. 23) Eardrum after sound passes through ear canal. 25) No. 27) 2 m. 28) 68 m. 29) 0.002 s. 31) 600 m. 32) 330 m/s. 33) 3 m. 34) Yes.